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Recommended Practice

AIIM ARP1-2002

Implementation Guidelines and Standards Associated with Web-Based Document Management Technologies

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1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910 USA
Tel: 301.587.8202
www.aiim.org

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AIIM Recommended Practice —

Implementation Guidelines and Standards Associated with Web-Based Document Management Technologies

An AIIM Recommended Practice Report prepared by
the Association for Information and Image Management International

September 20, 2002

Abstract
This recommended practice presents a set of procedures and activities, which should be considered and/or performed during implementation of the selected inter/intranet document management based technologies. This document will provide user level information outlining specific recommended activities to be completed through the various project phases typically performed when implementing these technologies.

AIIM International
1100 Wayne Avenue, Suite 1100
Silver Spring, MD 20910-5603 USA
Telephone: 301/587-8202
Fax: 301/597-2711
E-mail: aiim@aiim.org
Web site: http://www.aiim.org

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Foreword

(This foreword is not part of AIIM Recommended Practice – Implementation Guidelines and Standards Associated with Web-Based Document Management Technologies, ARP 1-2001.)

At the time this AIIM Recommended Practice was approved, the Standards Board of the Association for Information and Image Management International had the following members:

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William Neale	U. S. TAG to ISO TC 171
Louis Sharpe	Picture Elements Inc.
Chris Thompson	Recognition Research Inc.

This standard was approved by Implementation Guidelines Committee. At the time this standard was approved, the Implementation Guidelines Committee had the following members:

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Introduction

While Document Management and Workflow technologies need to work in conjunction with a Records Management program, this document focuses only on the first two issues. Records Management, while an important part of any business plan, is not addressed here, but a working definition will help highlight the distinctions between it and Document Management.

Records Management

Document management system (DMS) products keep their own internal records of document check-in, document check-out, and version changes, as well as records of system performance. Records management (RM) is a separate process of formally identifying certain documents as business "records" according to an organization's rules and of "scheduling" them for retention and "disposition" (usually meaning destruction). The RM process may or may not be supported by a particular DMS product.

If the DMS database includes documents qualifying as "records," enterprises must determine if they are required by law or regulation to keep a record of each document's usage, or just the creation and disposition of each document. The RM process can be supported by a separate RM product used in conjunction with the DMS products. The RM process can also be supported by special RM features provided by the DMS product vendor.

All organizations, public and private, must perform recordkeeping activities. Typically, a Records Management Manual identifies and clarifies statutory requirements, administrative roles and responsibilities, and the scope and content of a Records Management program. It also offers guidelines and procedural information for daily operational use of public records maintained by the organization.

As a general rule, records may not be destroyed, microfilmed, or transferred to records storage facility without an official retention period approved by the authorized agent. In government, "public records" are frequently defined to include 'any paper; correspondence; completed form; bound record book; photograph; film; sound recording; map drawing; machine-readable material; optical storage meeting current industry ANSI, AIIM, or ISO specifications or guidelines; or other document, regardless of physical form or characteristics, and including such copies thereof that have been made by or received by any agency in connection with the transaction of public business.

In October 2001, a new international standard, ISO 15489, *Information and documentation — Records management*, was adopted, from which the following is quoted:

Section 3, "Terms and definitions"
"**3.16**
records management
field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records"

"**3.15**
records
information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business"

This new international standard was developed with the active participation of the U.S. National Archives and Records Administration. Together with its companion guidelines and additional parts being drafted, ISO 15489 is anticipated to supersede many if not all national records management standards. In the U.S., several document management software products have added records management components in order to become "certified" under a U.S. Department of Defense Standard 5015.2, *Design Criteria Standard for Electronic Records Management Software Applications*. Information about that standard and its product certifications is available at http://jitc.fhu.disa.mil/recmgt/.

AIIM, International, has a standards committee, C22, that is involved with information and records management in an evidentiary context. Persons interested in the subject are invited to visit the AIIM Standards Web site at http://standards.aiim.org/.

Implementation Guidelines and Standards for Web-Based Document Management Systems

1 Scope and purpose

The scope of the Implementation Guidelines for Document Management Systems is to present a set of procedures and activities, which should be considered and/or performed during implementation of the selected inter/intranet document management based technologies. This document will provide user level information outlining specific recommended activities to be completed throughout the various project phases typically performed when implementing these technologies.

The term document management used throughout this document is intended as an "all-encompassing" term referring to inputting technologies (scanning, indexing, Optical Character Recognition (OCR), forms, digital creation, etc.), management technologies (check-in/out, version control, workflow, and other work management tools), and storage (primarily optical/magnetic) technologies. Additionally, this document will provide information to users related to what technical reports, guidelines, and standards have been developed for technologies commonly available in document management systems.

1.1 Purpose

To educate and raise awareness related to planning, implementation, and management of web-based document management systems. It is intended to be from a vendor neutral perspective and includes input from various state and county agencies responsible for mandating statewide or countywide procedures. As many public and private organizations throughout the United States are already in the process of planning or implementing these technologies, an industry standard guideline incorporating methodologies, approaches, and considerations from a wide range of governmental agencies and private industry would benefit all users.

1.2 Objective

To define the topics and raise issues for each topic defined for the collective target audience: MIS staff, RM staff, vendors, integrators, and users.

1.3 Audience

This document is intended for anyone responsible for or interested in planning and implementing inter/intranet based document management systems.

1.4 Exclusion

This document is not intended to be an all-inclusive paper on document management and does not attempt to influence any single technology or provide legal guidance or legal opinions. While there are storage technologies other than optical/magnetic currently available (i.e., microfilm, microfiche, and hybrid storage systems) that are not included in this report, those technologies should be reviewed if determined to be appropriate by the end user organization. Technical reports and guidelines associated with these technologies are available under separate cover from AIIM International.

2 Definitions

Terms are defined in ANSI/AIIM TR2-1998, *Technical Report for Information and Image Management — Glossary of Document Technologies* available from AIIM International.

Terms are further defined in ISO 15489, *Information and documentation — Records management* available from the International Standards Organization (ISO).

3 Overview of document management technologies

Electronic Document Management Systems (EDMS) is becoming an all-encompassing term, referring to the integration of the underlying technologies including:

- Document imaging
- Document services
- Workflow
- Enterprise Report Management (ERM)
- Forms Management
- Optical Character Recognition (OCR) / Intelligent Character Recognition (ICR) Technologies

3.1 Overview of Web-based document management technologies

Web-based document management systems provide users with access to more applications within a common user interface, through the utilization of industry standard Internet browser technology. One of the primary reasons users prefer this level of technology is the distributed functionality that becomes available almost immediately after implementation.

These systems provide numerous advantages over traditional client/server-based document management systems because users are already comfortable with browsers and the cost of implementing “thin-clients” is continually decreasing.

From a high-level perspective, web based document management technologies enable users to:

- control access to documents;
- link documents to various sources outside the Web/HTML environment;
- update documents;
- maintain documents with native editors or manipulation tools;

- position documents as part of a business process requiring bi-directional communication; and
- customize format, content, and accessibility for each individual user.

These systems enable browser-based access to document repositories which were previously available only within very closed and proprietary environments. This browser-based access has become the lowest common denominator among document management products from a user perspective. With this type of user interface, people utilizing this technology don't need to learn new interfaces every time different types of information become available. An example of this would be when organizations begin deploying information in non-traditional methods such as video, audio, or non-word processing based formats. The browser service would determine how to present the information to the users, allowing the users to determine whether they need the information or not. Previously the users were forced to first determine whether they needed the information, and if they did require the information, the users had to determine the best method of retrieving the information and then viewing it. In many cases, this became an extraordinary effort significantly increasing the cost of performing business activities.

From the end user perspective, browser-based functionality is a primary reason the concept of the intranet has grown and become widely accepted throughout organizations. Using this technology enables users to establish online information repositories allowing for virtually any type of information to be accessed from a browser.

Many document management products enable users to save information in user-selectable formats including HTML and PDF format. This capability prevents the loss of formatting and other information which typically occurs when the users are forced to convert the information with third party products. The result of this technology trend is that the client workstations are no longer required to maintain copies of various authoring tools to access the desired information. With some products, the browser on the client can launch the native application or a viewer and maintain the original formatting and, possibly, editing. However, this approach requires that the native application or viewer be resident on the client platform, thus limiting the concept of universal access and ultra-thin clients.

To address this issue of installing complete copies of applications on user workstations for read-only access, many vendors have developed products which are now readily available, at little or no charge, to the end user for read-only versions of the applications. Examples of this include Adobe's PDF reader, Microsoft's Word Reader, and Wang's Image Viewer (primarily for G3/G4 TIFF formatted images). Some vendors provide document viewers with support for a significant number of different file formats and include these tools within their document management services.

Web based document management systems enable applets, or thin-clients, to check information in and out of the repository, allowing users to make changes and check the modified information back into the repository. The browser client becomes a combination reader and editor for all types of information. This has been achieved through the use of applets which can be downloaded when required or requested, or can be pre-loaded on the user workstations. These applets can be further managed from a centralized point enabling system administrators to control not only which functions are available, but also which users have access to those functions.

With these advances in technology, information can be more tightly tied to business processes and collaborative information creation and management is greatly facilitated in a secure and controlled environment. The highest level of Internet-related functionality is provided by products that specifically exploit the dynamic nature of Web content and transform documents into entities capable of customized one-to-one communication.

3.2 Overview of imaging technologies

Even in today's world, many organizations still function almost entirely in a "paper-driven" environment. This environment is a direct result of the need to maintain information on all aspects of the organization.

As the organization expands and the volume of work increases, the amount of documentation grows at an enormous rate. This growth forces organizations to either dispose of documents not considered essential or increase the storage areas used for the filing of these documents. The problems which may occur are significant and could have an adverse impact on the overall customer service provided by the organization.

To alleviate these problems, many organizations began using microfiche and microfilm technologies as well as establishing complex manual procedures to support organizational demands. When document management technologies are used to replace or augment manual paper management systems, organizations face another issue: how to successfully implement the desired technologies without adversely affecting the day-to-day operations. When addressing this issue, organizations need to determine which technologies are appropriate to address identified business and technical needs. It should be recognized that when implementing these technologies, organizations will need to review existing day-to-day operations to identify where the technologies would be of value to prevent redundant processing.

From a high-level view, there are four basic components to document imaging systems:

- input,
- identification,
- storage, and
- retrieval.

The **input** components typically consist of multiple single-sided (simplex) and/or double-sided (duplex) document scanners (or other input devices such as facsimile). The scanning stations are used to convert hard copy documents into a digital format for subsequent storage and management in the document imaging system. The **identification** stations allow users to identify (or index) incoming documents allowing them to be retrieved at a later date. The **storage** portion of the system consists of various storage components which are connected to the document management or workflow server. The storage sub-system is accessed by the appropriate server to retrieve and store information managed by the system. The **retrieval** portion of the system consists of the user issuing a request for information which is then processed by the server. These requests are processed and the information is retrieved from the appropriate storage media connected to the server.

3.3 Overview of document services technologies

Document services technologies enable organizations to manage their documents in an electronic format. This management includes the ability to restrict access to certain documents or group of documents to only authorized users. Along with security controls, these technologies enable users to be granted different levels of access. For example, the author of a document might only grant read access to all users outside of a specific department while granting "check-in/out" control to others who are working on updating the document. As the other users prepare to update the document, they would "check" the document out of the library, update the information, and then "check" the document back in.

Document services technologies would ensure that any other user attempting to check the document out would firstly not be allowed to check it out, and secondly they would be notified that someone already has a copy being updated. Upon completion of the update cycle, the system automatically updates the version number of the document and makes it available to all authorized users.

Another portion of this technology is the ability to convert the document into a format accessible through an inter/intranet. This conversion is typically into either HTML or XML, and is then published directly, or through an automated process, to the pre-configured web page for general access.

3.4 Overview of workflow technologies

Workflow provides for the automation of business processes and enables users to control the process logic in all the various environments throughout their inter/intranet. This ability to control the various business processes, the document management system's control over content and integrity, enables mission-critical, document-centric business applications to operate in an environment otherwise cumbersome to implement and manage. This has resulted in most document management vendors offering an integrated workflow engine or integrating the workflow engine with various workflow products readily available throughout the industry. The primary difference between these two approaches is whether the product consists of only those components developed by the primary product supplier or whether the primary product supplier has integrated specialized technologies developed by other suppliers.

In the new approach to organizational networking, web-based workflow is becoming a major tool in the automation of document and information posting to a web site. In these environments, workflow applications are becoming tightly integrated to specific documents and other types of information. The actual integration of workflow and document technologies is becoming more prevalent as various coalitions and standards committees continue establishing implementation guidelines and procedures. These guidelines and procedures are further enable the acceptance of various technical standards and help move this industry to the next stage of maturity.

The maturity of workflow technology and the associated trends are based on the separation of the processing rules from the processing scripts or work routing. In more sophisticated web-based environments, workflow scripts could be tightly integrated to specific documents making the routing, editing, approval, and submissions of documents manageable at the user level. Interaction with the various thin-clients would trigger sub-processes as defined in the workflow script, resulting in the appropriate applet being downloaded and/or launched.

Workflow computing is the automation of work processes performed daily throughout any business. A workflow application automates the sequence of actions, activities, or tasks used to run the process. This includes tracking the status of each occurrence of the process and providing tools to manage the process. There are four basic components to a workflow system: processes, individuals, tools, and objects.

- **Processes**: An automated workflow application is made up of the different tasks or activities that must be completed to achieve a business goal. The workflow engine manages these processes. The workflow application works in conjunction with the engine to manage the work process.
- **Individuals**: Processes are performed in a specific order by specific individuals (or automated agents taking the role of individuals) based on business conditions or rules.
- **Tools**: There are various tools accessed by the user including word processors, terminal emulators, etc. These tools are used to access existing host applications and perform office related activities.
- **Objects**: Objects is another term for data used by the workflow system. The term became more prevalent after the computing technology became sufficiently sophisticated to support video, audio, and other forms of information into the workflow system. These objects become the work item to be processed during the normal course of business.

3.5 Overview of ERM technologies

Enterprise Report Management (ERM), which was previously known as Computer Output to Laser Disk or COLD, is an integrated software and hardware solution that stores and indexes formatted computer output (pages) on optical disk, magnetic disk, or magnetic tape as an alternative to paper printouts or computer output microfilm (COM). This formatted output consists of point-in-time daily, weekly, and

monthly reports, such as transaction listings of statements and invoices. Once this page output is stored on the ERM subsystem, it can be electronically retrieved, viewed, printed, faxed, and distributed to workstations and host computer terminals within departments or throughout an enterprise.

While there are many different data types in the computing environment, the type of data which ERM technology is concerned with is typically the result of transactions (data files and database records) being formatted by the application into page-oriented form for printing on paper or computer output microfilm (COM). The structure and format of this output is known. This data is time-period focused—it is a snapshot of an internal system at a given point in time. These reports are often the basis for analysis or comparative reporting and they include the printed record received by members such as a statement or invoice. ERM systems have been designed primarily to handle this formatted output.

Essentially, the ERM process involves two procedures: recording (indexing and storing the data) and retrieving (making the data available to users). Within these two simple procedures, however, lay a myriad of complex tasks. Data must be downloaded or transferred to the ERM system server before it can be processed. The method used to transfer the data from the mainframe/host system to the ERM subsystem will vary depending on the communications capabilities currently in place. Recording consists of writing new documents to the storage media and then making them available for retrieval. Recording speeds vary from system to system and are most critical in high volume systems. The recording process involves:

- transferring the data to the optical subsystem from the host,
- processing the pages from the transferred file (i.e., extracting index keys, compressing, and writing to optical disk), and
- adding the index records to the magnetic disk database.

The retrieval process consists of the users accessing the system and selecting the appropriate report, or portion of the report, for viewing. The selection of the information to be retrieved is based on information entered, by the user, into the query screen portion of the viewing software. After the user selects the report, or portion of the report to be viewed, the system retrieves the information, displaying it on the user's workstation.

4 EDMS guidelines / standards

4.1 Introduction

Industry guidelines and standards enable departments to follow industry accepted practices and procedures. Standards in the U.S. are generally voluntary and adherence is not necessarily required or legally binding unless specified in an RFP or contract. Standards and recommended practices specified in a federal, state, or local law or regulation are required specifically in the area covered by the law or regulation. Users wishing to require adherence to a standard or recommended practice should specify them in their procurement documents and contracts since this is the only way a vendor is required to meet a standard. Users of standards should also be careful to specify exactly what requirements in a standard must be met. It is possible for a system to “meet” a standard and still not deliver the required results if the contract is not specific about the contents of the standard or recommended practice.

Following industry guidelines and standards will further improve the ability of an organization to implement the selected technologies following policies and procedures found necessary, throughout the industry, to implement highly successful systems. These guidelines and standards also enable the departments to implement products and technologies meeting their specific needs while being able to share information with other departments who may, or may not, have the same product installed.

Industry guidelines provide specific information to users which will enable them to gain detailed information necessary to successfully prepare for, select, and implement the desired technology. The guidelines which users should evaluate include:

- Request for Proposal (RFP) guidelines
- Recommended document preparation procedures for scanning/indexing
- Planning considerations for technology implementation
- How to determine what information should be included during document indexing
- Legal considerations
- Forms design
- Selecting the appropriate image compression methodology to be used
- Sampling procedures to verify information being scanned and indexed
- Establishing quality requirements and quality control

The industry standards include standards related to document services integration and toolkits, workflow integration and toolkits, document imaging related standards, and optical storage standards. Product suppliers must certify that their products meet the specified standard(s) in order to ensure that the product is, in fact, compliant with the relevant standard(s). It is important to note that as the industry creates and approves new standards and guidelines, this document will be updated to reflect those changes after the standards/guidelines have completed through ANSI/AIIM, ISO, or other appropriate approval processes.

4.2 Selecting the appropriate guideline / standard

It is recommended that departments/agencies preparing to select document management and workflow products review relevant industry guidelines and determine whether the vendors being evaluated meet the appropriate standards associated with that portion of the technology. Detailed information on each standard and guideline are provided in Appendix A. Examples of various guidelines and standards for each of the technologies are documented below.

4.3 General

4.3.1 User guidelines

User guidelines should be reviewed and will assist the department during the preparation, planning, and implementation phases of the document management project.

4.3.1.1 Terminology

To gain an understanding of various terms used throughout the industry, the department should review ANSI/AIIM TR2-1998, *Technical Report for Information and Image Management — Glossary of Document Technologies*. This document provides a detailed list of various terms which will be encountered during discussions with product vendors and integrators.

4.3.1.2 Human and organizational issues

When implementing these technologies, the department will face several human and organizational issues. The *Human and Organizational Issues Guidelines for Successful EIM System Implementation* (ANSI/AIIM TR35-1995) provides detailed information gathered throughout the industry related to system

usability and adoption by the users. These guidelines will assist the department during all the change management activities required for successful system implementation.

4.3.1.3 Request for Proposal (RFP) development

Prior to selecting a specific product/integrator, the department should document system requirements and provide them to those vendor(s), or integrator(s) being considered. ANSI/AIIM TR27-1996 is a guideline which can be used to develop these RFPs. Regardless of whether the RFP is being sent to a single vendor/integrator or multiple vendors/integrators, this document should be developed to enable the department to clearly define their requirements and enable the vendor/integrator to clearly understand all business and technical goals and requirements.

4.3.2 Legality issues

Legality issues that should be considered by agency counsel include:

4.3.2.1 Expungement

Expunging information from databases and storage systems need to meet specific legal requirements. ANSI/AIIM TR28-1991 provides detailed information related to information expungement as ordered by the courts or other administrative authority.

4.3.2.2 Legal acceptance of records

The four-part technical report, *Performance Guideline for the Legal Acceptance of Records Produced by Information Technology Systems* (ANSI/AIIM TR31:1, ANSI/AIIM TR31:2, ANSI/AIIM TR31:3, and ANSI/AIIM TR31:4), provides detailed information on evidentiary issues associated with using electronic imaging systems and optical storage technologies.

4.3.2.3 Retention requirements

Users and systems designers should consult the organization's established retention requirement set forth in their Records Management Policies and Procedures. The system being implemented should ensure that the system is able to retrieve the information throughout the required document life cycle. The storage media and its life expectancy rating must be considered, hardware and software obsolescence issues must be evaluated, and a sound migration strategy must be developed to ensure access.

4.3.2.4 Redaction[1]

The process of redaction is elaborate, expensive, and subject to judicial review. It usually involves a careful, word-by-word examination of a document, the identification of the pieces to be "removed," the necessity of showing the location of the removed pieces, the inability of the document viewer to discover the redacted content, and the supervisory review and approval of the redaction—all with the recordkeeping to prove that the redaction was appropriate and conducted according to proper procedure. Therefore, the redaction process is usually done in a highly controlled local setting rather than in a Web setting. Redaction process software could be external to the document management system.

[1] Redaction refers to a process by which parts of a document are kept from disclosure. The parts might be such snippets as the name of a person, a Social Security Number, or entire paragraphs that reveal trade secrets. Documents that are obtained in a law suit discovery or in response to a Freedom of Information request to government agency might contain pieces of information that are protected by law from being revealed, e.g., because they contain privacy identifiers or trade secrets or other privileged information. In many redactions the rendition of the redacted document, whether hard or soft copy, will show a black bar through the space where the redacted content was located.

4.3.3 Technology standards

Technology standards are developed for specific technologies and not at the "general" level. All industry related and relevant standards are listed in the appropriate technology category within this document.

4.3.4 Implementation considerations

Implementation considerations should include:

4.3.4.1 System administration

When selecting the technologies required to support the business requirements, the department should receive and maintain detailed information related to system administration functions required to administer and control all applications, security, system server hardware, and data backup/migration. This information should be provided by the product supplier, or system integrator. These requirements should include:

- operating system management (updates, patches, backup, restore, etc.),
- application software (updates, patches, backup, restore, etc.),
- system security (user additions/deletions, security modifications, etc.),
- data migration (retention periods, media replacement, etc.),
- hardware trouble-shooting tools, and
- database management utilities.

4.3.4.2 Security requirements

To ensure the technology supports secure access that meets the department's business needs, the solution must also be assessed with respect to how it supports end-to-end security as related to user authentication, document authentication, and secure network transactions over the Internet, Intranet, and Extranet as necessary. Understanding the complexity and scope of an organization's security issues especially when dealing with the Internet will require the collaboration of multiple departmental disciplines including legal, business operations, system administration, network administration, vendors, and external users of the system.

4.3.4.3 Capacity requirements

To ensure an accurate assessment of the scope and size of the document management system, the department should attempt to determine the capacity requirements of the expected solution. While the natural tendency of any department is to regard all documents as essential and to store all documents with equal access, the selective categorization of documents by type, retention period, and frequency of access may contribute greatly to the final cost of the solution. Categorization of documents based on an organizations usage statistics is vital to determining how the document is finally stored in the system including optical library units and online storage. The following is a partial list of some sizing parameters to consider:

- system availability requirements,
- number of form types and documents,
- retention requirements by document or form type,
- frequency of document access,

- peak daily volume of new documents processed,
- volume of new cases for workflow consideration,
- number of internal users (case workers, researchers, data entry operators),
- number of users (local and remote),
- number of departments, and
- number of remote sites.

4.3.4.4 System performance

To ensure that information is available for use by the users within anticipated time frames, it is important that specific requirements related to performance expectations be defined. The department should determine the anticipated response times they expect from the system for:

- document retrieval from long-term storage (optical disc),
- document retrieval from online cache,
- document viewing (over the LAN, WAN, Internet),
- document printing, and
- scanning/indexing performance.

4.3.4.5 System scalability

When considering document management and workflow technologies, the department should ensure that the solution be scalable. This scalability includes the ability to increase the number of processors in a multi-processor environment, increase the number of servers to operate in a cooperative fashion, as well as increase the storage capabilities as required by the department. Requirements should include:

- the ability to increase the number of system users without component replacement;
- the ability to support other technologies, i.e. OCR, form management, etc.;
- the ability to support multiple servers and optical jukeboxes in a distributed manner; and
- the ability to support symmetrical multi-processing.

4.3.4.6 Fax services

The utilization of facsimile transmission services enables users to send and receive faxed documents directly at their workstation. When considering these services, departments should evaluate the following requirements to support their specific business needs:

- Outgoing fax without document viewing: This provides the ability for users to fax documents directly from their computer without viewing each document first. The user should have the ability to select a range of documents and have them routed to the fax "server" for transmission.
- Outgoing fax after document viewing: This provides the ability for a user to fax a document during viewing. The user should have the ability to attach other documents to the outgoing fax as appropriate.

- Incoming fax processing: As incoming documents are received, the system should support the ability to receive incoming documents and automatically route the document based on configurable rules (via a system administration interface) either by incoming telephone number or through forms processing.
- Fax status reporting: The system should provide a fax reporting capability enabling users to view status and historical information related to faxes sent by the user. This historical reporting should be based on user security rights, preventing users from accessing other users' history, while supporting users with higher levels of security to access all historical records.

4.4 Document imaging

4.4.1 User guidelines

User guidelines that should be reviewed for document imaging technologies include:

4.4.1.1 Planning

During the planning stages of the project, the department will need to address various issues including planning for the implementation of document imaging and preparing the documents to be scanned. ANSI/AIIM TR15-1997 provides detailed information at the user level related to the various planning and preparation activities that are recommended throughout the industry.

4.4.1.2 Indexing the information

As the department plans to implement document imaging, the department should review the suggested index field guidelines (ANSI/AIIM TR40-1995). These guidelines provide detailed information which should be considered when planning the indexing requirements for all documents being scanned. Establishing all the necessary index values prior to system implementation greatly improves the value and quality of information being scanned and stored in the system.

4.4.1.3 Storage technologies

During the planning stages of the project, the department should review *The Use of Optical Disks for Public Records* (ANSI/AIIM TR25-1995), which provides guidelines for the planning, implementation, and operation of long-term and permanent public records storage on optical media.

4.4.1.4 Image formats

The department should ensure that all information being scanned is stored in an industry accepted format. There are various compression methodologies that are available. ANSI/AIIMTR33-1998 is a guideline that provides information enabling users to select the appropriate compression technology which the vendor/integrator must support for different types of data. The different types of data may include scanned documents, line art, photographs, etc.

4.4.1.5 Indexing quality control

As the system is moved into production, it will become important for the department to develop a methodology of reviewing both index data and the actual documents to ensure the information is available and readable. The sampling procedures guideline (ANSI/AIIM TR34-1996) provides detailed information to the users which can be used to set up and perform the necessary index and image data to meet required quality guidelines for the department.

4.4.1.6 Scanning quality control

Scanning quality control measures enable users/operators to ensure that the scanner is operating within anticipated tolerances. ANSI/AIIM MS44-1993, *Recommended Practice for Quality control of Image Scanners*, provides additional information for 8 1/2 X 11 inch scanners. Following these procedures will enable the user/operator to ascertain that the scanner is properly set up before scanning actual documents.

4.4.2 Technology standards

Technology standards in this area are currently being developed by ANSI/AIIM. As these standards are completed and approved, those applicable will be incorporated. Additional information and current status updates on these standards are available from AIIM International.

4.4.3 Implementation considerations

Implementation considerations should include:

4.4.3.1 Document scanning

The document scanning portion of the system must provide the ability for the users to quickly digitize documents and route these documents to the person performing the indexing operation. Requirements associated with this portion of the system should include:

- the ability to support both batch processing and single document scanning and indexing;
- the ability to support document re-scanning;
- the ability to support both simplex and duplex scanning;
- the capability of the scanner to scan at the resolution meeting the specific requirements of the system, such as 200, 300, or 400 DPI;
- the ability to set page breaks when batch scanning documents of fixed length;
- the ability to preset common fields (for indexing purposes) when scanning in batch mode; and
- the ability to support auto-indexing of documents using barcodes, OCR, or Intelligent Character Recognition (ICR).

4.4.3.2 Document scanning and indexing

When implementing document scanning and indexing technologies, the requirements should include detailed information related to all processing phases. If color documents are to be scanned so that the image captures the color, the scanner must be capable of doing so. Patch code and bar code hardware and software should be included if these techniques are to be used for the automation of data indexing. When using these technologies, the user should be aware that bar coding and OCR technologies typically minimize keystroking during the indexing phase but do not always negate the need for manual indexing. The level of information captured automatically will vary depending on the quality of the incoming document and the ability of the system to accurately recognize the required information.

The issue of performance is of critical importance and the department should ensure that the selected solution provides the ability to scan and index documents within anticipated time frames. The various processes associated with document scanning and indexing includes:

- the time required to prepare the document for scanning;
- scanning the documents, ensuring all documents and all sides (for double sided documents) are captured;
- the time required to index and verify the documents; and
- the time required to route the document to the end user for further processing (if workflow technologies are being utilized).

4.4.3.3 Scanning / indexing performance

The system must be capable of scanning either single or double sided documents with scanners capable of processing the daily work volume at the selected scanning site. This processing will include document preparation, scanning, and indexing. The system must also be capable of supporting low, medium, and/or high volume scanning capabilities depending on user requirements and selected scanner. The total number of scan stations and indexing stations must be determined by the department to ensure that all work can be processing within anticipated time frames and stations are available for use when needed.

When establishing the scanning and indexing performance, the department should include all necessary steps from the initial mail preparation through the index verification stage to ensure that anticipated processing and response times are achievable.

4.4.3.4 Document image compression

Image compression/decompression should support CCITT Group 4, JPEG, JPEG 2000, JBIG, or other output format standards with no proprietary alterations of the algorithms. The selected compression technology should not include extraneous information not supported by the relevant industry standards. Users should be aware that when using proprietary file formats such as Adobe's PDF, the patent holder may require royalties and/or other fees to be paid on a periodic basis which are usually based on the total number of pages converted into that specific format. These licensing/royalty issues do not occur with non-proprietary formats.

4.4.3.5 Post-scanning processing

Post processing may be used to provide image "clean-up" after the scanning and prior to indexing and final storage. This software generally performs de-speckling, de-skewing, and other functions to improve the quality of the scanned image with limited operator intervention.

4.4.3.6 Document indexing

Detailed information related to all aspects of document indexing should be clearly defined. This should include the ability for users to index documents on workstations, other than the scanning stations, and support the ability to:

- index images either prior to storage or immediately after storage,
- add other indexing values, and
- batch index.

4.4.3.7 Optical Mark Reader (OMR), OCR, and ICR processing

The main objective of the available recognition technologies is to reduce the amount of manual data entry for the capture of both hand-printed and machine-printed information from digitized documents. Although the technology will never eliminate the need for manual data entry, the effective use of these technologies

on targeted documents have produced remarkable benefits often evaluated in reduction of manual keystrokes. The following is a brief list of evaluation criteria to consider when analyzing the use of automated data capture:

- Is it possible to identify documents with sufficient volume to justify automated data capture processing? These are typically forms containing both structured and unstructured content, but with identifiable information to be extracted.
- Is it cost effective? Determine the amount of data to be captured and the cost to support a manual solution; then compare it to an automated data capture solution.
- Is it possible to re-design the target forms for improved recognition? The use of checkboxes, patch codes, bar codes, dropout ink, and OCR fonts all provide considerable improvement in recognition accuracy rates.
- How will the documents be batched for scanning? Will they use mixed form sizes? Will they use mixed form types? Is it possible to introduce a batch header sheet to streamline the scanning process?
- Identify the business rules that may be used for post-recognition processing to improve the accuracy of the information captured. For example, the capture of a 9-digit social security number can be utilized to automatically verify the name and address information against the organization's existing database.

4.4.3.8 Quality control

When defining quality control for document scanning and indexing, the department should include the ability for the user to be able to:

- check and validate the complete scanning and indexing process,
- ensure data indexing accuracy,
- facilitate the re-scanning of poor quality images,
- verify readability of each page of each document,
- verify proper indexing of each document,
- verify proper page counts for each document, and
- verify proper security for each document, file section, and file.

4.4.3.9 Query / retrieval performance

Query and retrieval performance is commonly of high importance to the users. The user should define the anticipated performance requirements prior to system design and hardware procurement. These performance requirements should include maximum response times anticipated during production taking into account: the total number of anticipated simultaneous user requests; the total number of drives; whether the information is available in an on-line, near-on-line, or off-line mode, etc.

These time periods include all time required to retrieve the appropriate optical/removable media (when necessary), reading all requested pages from storage media, storage of all requested pages on magnetic cache (if being used), and subsequent transmission of the first page to the user for viewing. Whenever removable media (i.e., WORM, CD, etc.) is implemented, this response time should take into account time required to: "spin" the drive down, eject the media, retrieve new media from the storage bays, insert the media into the drive, "spin" the drive up, and retrieve information from the media.

4.4.3.10 Printing performance

The imaging system must be capable of printing user selected documents within anticipated user established time frames. This response time includes document retrieval from optical storage and transmission to the selected printer. The user should have the ability to select a document, or range of documents, to be printed without being forced to view any of the pages prior to print submission. The time of one minute to retrieve documents for printing is greater than the times for document viewing following the concept that retrieval requests for viewing have a higher priority than documents being retrieved for printing.

4.5 Document services

4.5.1 User guidelines

User guidelines in this area are currently being developed by ANSI/AIIM. As these guidelines are completed and approved, those applicable will be incorporated.

4.5.2 Technology standards

Technology standards should include:

4.5.2.1 Open source distribution

The product vendor/supplier should certify that the department can use openly contributed document management software and metadata definitions (information describing the document) with their specific product. This will enable the department to integrate other document services technologies without significant system re-development.

4.5.2.2 Development toolkits

The product/vendor supplier should certify that the system utilizes industry standard application programming interfaces. This will enable the department to implement a document services system and access information stored on other document services implemented throughout the network. These toolkits simplify application development and will enable the departments to develop a common user interface regardless of the product used to “house” the actual data.

4.5.3 Implementation considerations

Document services enable users to create, modify, and manage electronic files typically associated with various office processing applications. These capabilities include:

4.5.3.1 Version control / check-in and check-out

The department should ensure that the product fully supports version control and check-in/out methodologies. Version control should automatically update the version number whenever a previously "checked-out" document is returned to the information repository. The system should prevent more than one person from checking documents out for modification and utilize a security model ensuring that only authorized personnel can perform these functions.

4.5.3.2 Logical folders

The ability for the users to "logically" link a single file to multiple folders is important to prevent document duplication. The department should ensure that the selected product supports the ability for an authorized user to create a copy of a file within a specific folder, or set of folder(s), while maintaining only one physical copy of the document within the system. The system should provide information related to which folders are "linked" through a query mechanism available to authorized users.

4.5.3.3 Group / user security

The system should provide the ability for departments to apply security access/restrictions at both the group and user levels. The group level security should apply to all users within the defined group, while user level security should provide additional security restrictions or capabilities for specified users.

4.5.3.4 Document / file security

The system should provide the ability for departments to apply security at the document or file level. Only those users with appropriate security levels should have access to these documents and/or files. This security should include read, update, annotation, highlighting, “mark-up,” and creation control.

4.5.3.5 HTML / XML conversion

The system should provide for either HTML or XML data conversion (or both) as required by the department. This conversion should enable the users to convert existing office documents into a format which can be accessed through a standard web browser.

4.5.3.6 Document publishing

The system should provide the ability for a department to update an existing web page automatically either after data conversion or review by the “webmaster.” This document publishing functionality should include the utilization of web templates which would be used to reformat the document into either HTML or XML format.

4.6 Workflow

4.6.1 User guidelines

User guidelines in this area are currently being developed by ANSI/AIIM. As these guidelines are completed and approved, those applicable will be incorporated.

4.6.2 Technology standards

Technology standards should include:

4.6.2.1 Workflow development toolkits

The vendor should certify that the product supports the various Workflow Management Coalition (WfMC) Application Programming Interfaces (APIs). These APIs, as documented in the WfMC Application Programming Interface document, will ensure that the implemented product utilizes industry standard application interfaces. This will enable the department to have the user interface developed and operate with other standard compliant workflow systems without any significant system re-development.

4.6.2.2 Workflow auditing

The vendor should certify that the product supports the WfMC audit specification. This specification details information to be captured and managed by the workflow system during operation. This will ensure that all relevant data is associated with all functions within the workflow technology.

4.6.2.3 Workflow interoperability

The vendor should certify that the product supports industry interoperability standards including the usage of standard e-mail systems. These interoperability standards will enable the department to share workflow information directly between different workflow systems without requiring specialized development.

4.6.3 Implementation considerations

Implementation considerations should include:

4.6.3.1 Workflow

Workflow technologies include various types of routing including ad-hoc routing, administrative routing, and production routing. Ad-hoc routing enables the user to specify a specific process for a document to follow for that document only. Administrative routing enables users to define specific routing for a specific type of work that is always followed, regardless of the data within the work being routed. Production routing enables the users to define rules and work methods based on the document type and data contained within the work item. As the data changes, the production routing system would process the document accordingly, including the ability to support work timeouts, escalation, and work reassignment.

4.6.3.2 Role versus user

There are two approaches to defining users within a workflow environment. The first method is to define a specific user to manage a specific task or activity. The second approach is to define a role within the work task or activity and then assign as many users as necessary or appropriate. The departments should require a "role" based system when implementing production workflow technologies.

4.6.3.3 Routing requirements

For those departments requiring production workflow, the system should allow a user to route a document, section, file, or memo to another user. The following capabilities should be considered:

- the ability to automatically route documents into a routing queue based on document type or "type of work,"
- the ability to support multiple routing queues for each user based on the "type of work,"
- the ability to sort/retrieve documents in a routing queue in date order,
- the ability to sort/retrieve sections in a routing queue in "type of work" order,
- the ability to sort/retrieve documents in a routing queue in document type order,
- the ability to sort/retrieve documents in a routing queue for a specific person,
- the ability to "pend" or "hold" items in that user's routing queue for work at a later time,
- the ability to retrieve specified documents from the routing queue on demand,
- the ability to define which documents require additional documents prior to forwarding,
- the ability to define timeframes for when additional documents must be received,

- the ability to define action to take if specified documents are not received by specified date, and
- the ability to process defined documents as a “logical” folder.

4.6.3.4 Graphical rule designer

The system should support the ability for authorized users to create and modify work rules associated with the workflow system. This ability should include graphical based design and management tools which would be used to create/modify work rules within a Windows or browser based user environment.

4.6.3.5 Work monitoring

When selecting workflow technologies, the department should evaluate whether work monitoring is required for their operation. Work monitoring tools enable the users to monitor current ongoing work, in a real-time basis (typically). This work monitoring is used not only for "load-leveling" of ongoing work activities, but also to see if there are any "bottlenecks" in the overall workflow process.

4.6.3.6 Escalation procedures

For those departments requiring production level workflow, the selected solution should include the ability to automatically route work to a different user based on a specific rule or set of rules. The solution should also include the ability for users to manually escalate work as appropriate. During this escalation procedure, the solution should have the ability to have the work item returned or permanently reassigned as determined by the user.

4.6.3.7 Error handling

As workflow items can include information not previously anticipated during the rules definition, the department should require that the solution include the ability to handle errors within the routing of work through the workflow engine. The error handling should include the ability to pre-define a role which would receive the appropriate work items that are determined to be in error.

4.6.3.8 Time-out procedures

When workflow is implemented, there are many instances where the timeliness of completing a specific work activity, or group of activities, is important. The ability to establish timers for all work items becomes very important. The department should require that the solution support "timer" mechanisms and that the user is able to set these time-out values for specific activities throughout the graphical work "rule designer" tool.

4.7 COLD / ERM

Industry standards and user guidelines in this area are currently being developed by ANSI/AIIM. As these standards and guidelines are completed and approved, those applicable will be incorporated.

5 Implementation guidelines

These guidelines will assist users in the evaluation and selection of appropriate technologies addressing specific business issues. Each of the following sections provides detailed information on those activities requiring completion prior to product/vendor selection.

5.1 Process / procedure baselining

The purpose of process/procedure baselining is to clearly define existing processes/procedures and identify issues and problems currently encountered. This is achieved through a detailed analysis of existing processes and procedures. When performing this analysis it is important to capture and document activities including:

- how documents and information are received;
- what occurs to these documents after receipt (i.e., stamping, sorting, logging, delivery, etc.);
- how these documents are utilized and how many people use the same document to complete a specific activity or process;
- what happens to the document during the processing (annotation, highlighting, copying, etc.);
- after the processing is completed, where the document is stored, whether there are multiple copies, etc. and
- how document retention timeframes are established and adhered to.

This information should be gathered through interviews with selected users within each processing unit. These users should include experienced users (non-management) and management personnel. It is important to note that the team gathering this information should represent the business units from a user perspective and include all processes and procedures currently being used. As the baselining process continues, users may describe processes and/or procedures that are not "officially sanctioned" in the day-to-day processing. These workaround, or alternative methods, need to be documented, as well as all other user workarounds and methodologies implemented to complete daily work activities.

Upon completion of this documentation, the users should have an opportunity to review the baseline document to ensure that all functions and activities related to their processing have been accurately captured and documented. It is very common for these documents to have multiple versions presented prior to user sign-off. This is due to the primary fact that most users do not have complete documentation at the detail level related to how the documents are managed.

5.2 Anticipated processes / procedures

Upon completion of the baselining process, this information is evaluated to determine where non-technology based and technology based changes could be implemented. Examples of non-technology based change typically include reduction in document copies, the revision of outdated procedures, elimination of redundant procedures, and duplication of processes/procedures between departments.

5.3 Requirements definition

The requirements definition should be detailed and be directly related to issues documented during the process baselining activity. The following sections provide additional information on technology requirements associated with various aspects of document management and workflow technologies which should be considered by departments.

5.3.1 Records management

When researching technology solutions for document management technologies, public organizations must be cognizant of government mandated records management policies. A Records Management

Manual identifies and clarifies statutory requirements, administrative roles and responsibilities, and the scope and content of a Records Management program. It also offers guidelines and procedural information for daily operational use of public records maintained by the organization.

Public records may not be destroyed, or transferred to a records storage facility without an official and current retention period approved by the authorized agent.

As defined, "public records" shall include any paper; correspondence; completed form; bound record book; photograph; film; sound recording; map drawing; machine-readable material; optical storage meeting current industry ANSI, AIIM, or ISO specifications or guidelines; or other document, regardless of physical form or characteristics, and including such copies thereof that have been made by or received by any agency in connection with the transaction of public business.

5.4 Critical success factors

The definition of the critical success factors (CSF) for the solution should be clearly defined. These CSFs should enable the department and the vendor to identify those areas of critical importance related to the successful implementation of the desired technologies. Common examples of critical success factors from both a business and technical perspective typically include:

Business related goals

- Improved service: Users need the ability to quickly access and review information managed by the document imaging and workflow system.
- Ability to track and monitor work activities: The system should enable the users to track all ongoing work including the ability to re-assign work from one user to another. This tracking capability will enable the department to implement workload leveling when appropriate.
- Centralized historical information between departments: The system should enable the department to maintain centralized history related to all activities associated with the client/constituent. This history centralization should include both system generated activities (i.e., date scanned, date routed, etc.) and user generated information such as notes taken during telephone conversations. The users should have access to information allowed by their security access, limiting access to information required by higher levels of security.
- Increased efficiency of available resources: The department should be able to utilize the selected technologies to support ongoing business activities. The selected technology should enable users to decrease time spent on paper and file handling activities including stamping, stapling, copying, delivering, and filing documents, and increase time in the areas of work processing.
- Satisfy various government regulations pertaining to document retention: The use of optical storage must adhere to any laws and/or regulations covering the storage, retention, and retrieval of information on optical storage media.
- Decreased storage costs: The solution must provide the ability to utilize optical storage technology to reduce the overall cost of storing and retrieval of all “hardcopy” information.
- Decreased costs for manual document management: The cost for manual document management needs to be reduced, along with increasing the ability to provide greater improved service at a lower cost per request.
- Simplified user access to application, work-order, and other data: The overall solution must enable the users to quickly select and access the desired information without using highly complex user interfaces or tools. The user interface needs to be easy-to-use by the various system users.

Technical Goals:

- Scalability: The system must be fully scalable, allowing for an increase of the number of users and volumes of data without replacing primary system components. This scalability must be in the areas of increased memory, disk storage, optical storage, CPU speed and size, etc.
- Migration path: A clearly defined migration path must be fully supported by the proposed solution. This migration path must provide for the integration of new document management technologies to ensure proper integration without adversely affecting the proposed solution and/or data managed by the existing system(s).
- Modularity: The various client-based applications must be modular allowing for implementation of additional functionality without adversely affecting the overall system solution. This includes the ability to add routing, "virtual" file folders, high-volume printing, automated fax services, workload distribution, monitoring, etc.
- Web based access: The system must fully support inter/intranet web based technology where the various web servers will provide all the necessary mechanisms to store and retrieve information requested by the user, system level security for both users and data, and associated system management functions. All applications must be fully integrated to prevent redundant hardware and software on both the workstation and web server platforms.
- Utilize industry standard components (no proprietary architectures allowed): The associated components within the solution must be commonly available throughout the document imaging and workflow industries, be fully supported by the selected product supplier, and have full user and/or development documentation and libraries.

5.5 Document conversion issues

There are three different approaches to existing file/data conversion in use throughout the document management/workflow industries: full backfile, partial backfile, and as-needed. The department should review and determine which approach best meets the previously defined business and technical goals. The approach selected by the department will become extremely important if there are existing documents/files which need to be converted along with new and ongoing document receipt. Full backfile and partial backfile conversions typically require the selection of an outside "conversion" organization capable of processing large volumes of documents within a short time frame. The determination of whether to utilize an outside conversion organization or to convert using internal resources should be based on the volume of information to be scanned, the complexity of the required indexing, and the required expediency of the conversion. The various approaches which should be considered by the department include:

5.5.1 Full backfile conversion

When selecting a full backfile conversion, the department should have all existing hard copy documents available for use within the system in an electronic format. This conversion methodology is used when existing documents must be converted to meet business and/or technical goals. This methodology is typically very expensive and time consuming. The costs associated with full backfile conversions are based on the volume of documents being converted, and the total number of "keystrokes" needed to index each document which is calculated by the total number of characters. When calculating the total number of characters, the department should determine the level of accuracy required. For conversions where the conversion organization will only enter the information once (minimal data verification), the accuracy is typically not high enough to directly import the information into the document imaging portion of the system. It is recommended that a verification process (commonly achieved through

"double keying") be implemented, which increases the cost of conversion from an industry average of $0.10 per page to $0.20 per page.

5.5.2 Partial backfile conversion

This conversion methodology is similar to the full backfile conversion except that the department selects specific documents requiring conversion. Other than reducing the total number of documents requiring conversion, all considerations outlined within the full backfile methodology apply.

5.5.3 As-needed conversion

This conversion methodology would allow the department to convert documents only when required to complete an activity or process when new work is initiated. This conversion effort typically does not require the utilization of an outsourcing organization. To perform this type of conversion, the system should have a common "list" of where all documents are located, including both hard copy and electronic copies. The purpose of this list is to enable the users to quickly locate documents and determine whether they are available in the document imaging system or whether they are in hard copy format and require conversion. As new work items are received, the system should notify the user (or scan/index operator) that other documents are in hard copy format and need to be retrieved, scanned, and indexed, prior to routing to the user(s) for processing.

5.6 Product evaluation guidelines

When evaluating products, the department should consider several factors associated with the product and technology. Areas that should be considered include:

- Product maturity: The department should evaluate the level of product maturity. This evaluation should include determining how long the product has been generally available, whether the product is in an early release stage (is this a new version which has not been fully implemented by the user community yet?), or whether the selected product has been in production for at least one year. All products are continually being updated to provide new functionality, "bug" fixes, and adherence to new standards and technologies. It is important for the department to consider the maturity of each portion of the selected solution when determining the overall risk factors associated with implementing these technologies.
- Adherence to relevant industry standard/guideline: When reviewing various products and technologies, the department should consider whether the selected product(s) adhere to the appropriate standards and/or guidelines.
- Ability to meet key objectives and critical success factors: Each department should evaluate whether the selected product meets all, or a portion, of the previously defined critical success factors. It is important that the department select the most appropriate solution to address the previously defined business and technical requirements, rather than being forced to modify business/technical goals to meet the capabilities of the selected product. For those areas where the selected technology does not meet the stated requirements, the department should evaluate and determine the potential risk associated with changing the requirements. Changes to requirements may be in order due to technology not being mature, the requirement being a future item, the requirement not being critical to the success of the department, etc.
- Level of available technical support both during implementation and after: When selecting the product/technology, the department should review the level of technical support both during and after technology implementation. The department should determine whether the primary product supplier provides all support (with the exception of 3rd party development)

related to the installed product or whether technical support is only available through a reseller or "partner."

- Product Scalability: The evaluation of any technology component should include the consideration of the expected scalability of the solution based on its ability to meet future increases in processing volumes and expanded user base.
- System Security: Due to the enterprise scope security issues have over an organization, the department should evaluate security features in compliance with the department's internal policies and requirements. Often the ability of the product to leverage the security features of the native operating system provides a measure of protection that will alleviate concerns over proprietary implementations. The department may also want to evaluate and weigh product features that support managed network services over use of applications using open sessions or "captured sessions" that provide limited security.
- System Availability: Although system availability issues are often overlooked, many government agencies now expect a defined level of availability for the entire solution. The department should identify particular features of the product that directly contribute to system availability and identify those single points of failure in the solution that can cause a complete outage. This evaluation should be performed within the context of the risks associated with not having the solution available during normal business hours.
- Cost of Ownership: To determine the cost of ownership of a given solution, the department should also consider features that address basic system administrative tasks including configuration management, software distribution, addition of new users, auditing, error reporting, disaster recovery and restoration, performance measurement utilities, and management reports. Determine whether the product requires additional software and/or hardware to maintain a test, training, and development environment.
- Reference Site Benchmarks: When available, performance benchmarks from a known reference site of similar size is invaluable in determining the solution's ability to meet the expected volume of work. Evaluate the product based on its ability to meet the peak processing loads from the reference site.

5.7 Technology evaluation guidelines

When evaluating appropriate technologies required/necessary to meet business and technical goals, the department should consider several factors associated with the technology. The evaluation of the appropriate technology should include:

- COLD/ERM: COLD/ERM technologies should be evaluated after the department has determined whether data mining or report mining is required. When evaluating COLD/ERM technologies, the department should review the downloading, indexing, and storage processing requirements. Additionally, the department should consider the complexity of configuring the system to support new and/or modified report formats and indexing requirements. The ability of the technology to support simplified user access to data via a "query" screen and the ability to "cut and paste" information from a retrieved report or page to a standard office application should be considered. When evaluating COLD/ERM technologies, the department should ensure that the system is capable of loading and indexing the daily work volume without impacting the users. This functionality of "loading" should include automated indexing based on templates defined by authorized users.
- Document imaging: When evaluating these technologies, the department should meet with other organizations (similar in size and processing) who have implemented technologies by the product supplier in the same configuration being considered. This includes all aspects of document scanning, indexing, and verification. Overall system performance should be reviewed along with ease of use and processing accuracy.

- Document services: These services enable users to manage electronic information independent of the tool used to create the information (i.e., word processing, spreadsheets, facsimile documents, etc.). Document services typically enable users to check documents "in" and "out" of information repositories; support document version control; and support document, group, and file level security rules. When evaluating these technologies, the department should consider whether the product supports these functions along with being integrated with web publishing components (described below).

- Workflow: When the department determines that workflow technologies are required, it must be decided whether ad-hoc, administrative, or production level technologies are required. For ad-hoc and administrative routing/workflow requirements, the department should evaluate whether the product includes simplified authoring tools (for non-complex routing procedures) which can be used in a graphical environment along with monitoring capabilities. The monitoring capabilities should enable authorized users access to work queues or "baskets." These administrative and monitoring tools should further enable the authorized user to re-route work items and establish basic escalation and "time-out" procedures. These escalation and 'time-out" procedures enable the users to establish a specific amount of time which a work item can remain at any specific activity, or establish a total amount of time to elapse prior to automatically sending the work to a specific person or role.

  When the department determines that production level workflow technologies are required, the escalation and "time-out" requirements should be included, but additional functionality should be considered. This additional functionality should include the ability for authorized users to build complex workflow rules and support load-leveling functionality and real-time work queue or "basket" monitoring.

- Automated Data Capture: In many situations, the inclusion of OCR/ICR technologies can be justified solely on the reduction of manual data entry costs associated with indexing and capture of specific content from scanned documents. As there are many data capture products available that can be integrated with most document management systems, the department should pay particular attention to the expected benefits and the ability to measure these benefits during the evaluation. When evaluating OCR/ICR technologies, the identification of the following information may assist the department in determining the expected cost benefits in comparison to manual data entry:
  - variety of documents or form types to be identified automatically,
  - volume of hand-printed and machine-printed information to capture,
  - volume of fields per form or document,
  - volume of characters per field,
  - field type (numeric, alpha, alphanumeric),
  - extent of document preparation (pre-sorted documents, mixed form types),
  - extent of forms re-design (dropout, bar-code, OMR), and
  - identification of business rules to validate or enhance the recognition result.

- Forms management: When the department determines that forms processing and management are required, the department should consider both the forms creation and forms processing tools. The forms creation tools should enable the authorized user to develop new forms and modify existing forms for use within a browser based application. This forms design should include the ability to create fill-in boxes, checklists, pull-down selections, free-form text input, and digital signature attachment to the form during transmission. The forms management technologies should also enable the users to manage forms using version control and support the ability to either store the submitted data with the

form or store the data with the version number of the form. This information should be stored in the application database for further management and/or storage.

- Web publishing components: Whenever the department requires publishing documents to an inter/intranet server, the system should support the ability for authorized users to create templates associated with specific classes or types of documents. These templates should be used by the web publishing system to convert submitted documents to either HTML or XML format including graphic and table conversion as required. The system should provide a mechanism for authorized users to either configure the system to automatically publish these converted documents directly to the web server or send the converted document to a webmaster for review and website updating.

5.8 Acceptance testing criteria

There are several methods commonly used throughout the industry to perform acceptance testing including the product supplier developing and performing the acceptance tests, the users developing and performing the tests, and a project team consisting of both product suppliers and user management working together. The associated tests to be used should be based on the concept that a team representing all parties would be formed. This team should be present and work together throughout the various phases of the testing.

To ensure that each portion of this system is properly tested and that all portions of the foundational system being implemented meet/exceed system designs (with agreed upon modifications), both the department and the implementation team should participate in the acceptance testing and sign-off. Those components being validated and verified include:

- verifying all system functionality is operational and
- verifying system design specifications are met including agreed upon modifications.

This testing should be used to ensure that:

- the implemented system either meets or exceeds the system design documentation and
- all users can access and utilize the system.

Listed below are the guidelines that should be used during the system and user testing time periods.

1. The System Administrator should maintain a journal of events for the duration of the acceptance test and identify any hardware/software deficiencies to the product supplier.
2. No hardware or software modifications should be allowed without the approval of the project director(s)/sponsor and/or project manager. The department should provide a reasonable but limited amount of time for overcoming problems encountered during the acceptance test.
3. Suspension of the acceptance test should occur only by mutual agreement or if the department determines that the solution is not ready for testing. If this should occur, a re-test date should be scheduled when the product supplier is able to update the necessary components identified to be deficient.
4. At the end of the acceptance test, the project manager should review the list of deficiencies, if any, and make a determination to:

   (a) Accept the system based on the acceptance test results with the deficiency list, in which case the items on the list must be corrected by a mutually agreed upon date.

   (b) Reject the system based on the acceptance test results, in which case the items on the deficiency list must be corrected prior to a re-test, and another site acceptance test scheduled.

5.9 Rollout planning

When the department completes the acceptance testing, the planning of the technology rollout should include evaluating current and planned departmental activities including other projects, ongoing work activities, and the change management issues which can affect the overall implementation. The department should consider whether to integrate the system into a production mode using a phased approach following a "process" model or a "unit" model. The "process" model incorporates rolling out the application to all users associated with either a specific activity or group of activities. The "unit" model incorporates rolling out the application on a complete unit basis. If the department is implementing either document imaging or document services, the rollout plan should be based on a unit basis. When the department is implementing workflow technologies the department should consider rolling out the application following the process model to ensure that all users have access to the electronic information. If the department implements the workflow technology on a unit basis, caution should be exercised to ensure that users not within the selected department/unit will have access to the hard copy documents to continue/finish the work process. This is important as once the department begins managing and processing work in an electronic environment, the hard copy documents (previously scanned) would not be readily available.

5.10 Business practices documentation

Prior to the system being moved into full production, it is highly recommended that the organization prepare a business practices, or policy, document. This document should contain sufficient information to enable the organization to authenticate, or certify, that information contained within the digital system is accurate, reliable, and trustworthy. Information which should be contained includes, but is not limited to, a:

- description of how information will be scanned, indexed, and verified;
- description of how the system will be secured from unauthorized access;
- description of how documents will be secured from unauthorized modification or alternation;
- description of how authorized modification of documents will be managed, including audit trail information and the ability to retrieve any previous document version required to be maintained;
- description of how notes and annotations (if any) will be stored and managed, if they are a part of the business record;
- description of how these policies and procedures will be followed; and
- description of how the system will adhere to the published records retention schedule.

This document should be followed by all personnel using the system. As changes to the system are implemented, this document should also be updated to reflect system modifications. Changes to this document should be clearly marked to denote when the change took effect and what areas were affected.

5.11 Typical project activities and milestones

Listed below are industry standard activities and associated milestones which should be considered by the department when developing the project schedule. Activities may be added, modified, and/or deleted as determined to be appropriate. These activities include:

- RFP development, issuance, and award
    - Development (Sufficient information should be gathered to ensure technical and business goals are met.)
    - Issuance
    - Evaluation of responses
    - Award

  Milestone: Software/hardware ordered

- Application design and development
    - Detail design
    - Application development
    - Application testing
    - User acceptance testing

  Milestone: Application developed

- Detail workflow configuration/installation (if workflow being implemented)
    - Rules definition
    - Document security definition
    - User security definition
    - System software installed

  Milestone: System software installed and configured

- Training
    - Training PCs configured/tested
    - System server installed/configured
    - System administration training
- Application installation
- Imaging/workflow hardware
    - Imaging/workflow server delivered
    - Imaging/workflow server tested
    - Scanner delivered
    - Optical jukebox delivered
- System testing
- User practice/system testing
- Document scanning initiated
- Acceptance test period

  Milestone: Document management/workflow system live

Appendix A
Guidelines and standards

This section of the document provides detailed information on those guidelines and standards that are recommended. As these guidelines and standards are reviewed, the user should determine which guideline(s) and/or standard(s) would be beneficial to the department. Copies of all referenced guidelines and standards are available through AIIM International.

These guidelines and standards have been organized into 5 sections including:

- Document management industry guidelines
- Document services industry standards
- Workflow industry standards
- Document imaging industry standards
- Storage and archival standards

A.1 Document management industry guidelines

ANSI/AIIM TR2-1998, *Glossary of Document Technologies*
This glossary has been prepared to standardize the use of and meaning of terms associated with micrographics, electronic imaging, workflow, and related telecommunications/Internet and to provide an accurate, understandable guide for both the beginner and expert. The total number of terms included has been substantially increased, although many obsolete terms from the previous edition have been eliminated. In addition, the definitions for the terms retained in this edition have been reviewed and revised as necessary to reflect present-day terminology more clearly.

ANSI/AIIM TR15-1997, *Planning Considerations, Addressing Preparation of Documents for Image Capture*
The purpose of this technical report is to provide information to organizations considering image capture as a means of converting an existing record collection. This technical report identifies possible issues that can be encountered when preparing documents for image capture. Moreover, the purpose of this report is to provide the insight necessary for quality document preparation.

ANSI/AIIM TR21-1991, *Recommendations for the Identifying Information to be Placed on Write-Once-Read-Many (WORM) and Rewritable Optical Disk (OD) Cartridge Label(s) and Optical Disk Cartridge Packaging (Shipping Containers)*
This technical report outlines recommended information that should be placed on optical disk cartridges and optical disk cartridge packaging (on a physical label or other printed surface) for the purpose of identifying the optical disk. It applies to all sizes of optical disk cartridges that can store user-recordable information. This technical report does not attempt to specify the types of container(s) or protection needed for packaging optical disks. This report is meant to give guidance to the manufacturer, supplier, and user by providing labeling and identification related recommendations.

ANSI/AIIM TR25-1995, *The Use of Optical Disks for Public Records*
This technical report was funded by a grant from the National Historic Records and Publications Commission. It is intended for federal, state, and local government agencies and related entities with records management responsibilities. In recent years, a number of government agencies have considered using electronic document imaging systems and optical disk technology for records management applications. This report provides guidelines for the planning, implementation, and operation of such systems in applications involving long-term and permanent public records.

ANSI/AIIM TR27-1996, *Electronic Imaging Request for Proposal (RFP) Guidelines*
This technical report provides guidelines for developing request for proposals (RFPs) for electronic image management (EIM) systems that are used for document storage and retrieval and for systems used for document storage and retrieval in non-EIM environments, i.e., non-digital imaging applications. These guidelines provide step-by-step procedures for analyzing system requirements, developing functional specifications, and evaluating configuration alternatives. Guidelines have also been included for developing the administrative sections of an RFP. Office-type documents are the primary focus of this technical report. The specialized needs for engineering drawings and other document types are not considered. However, the basic principles for developing an RFP that are outlined in this document apply to a variety of electronic image-based projects.

ANSI/AIIM TR28-1991, *The Expungement of Information Recorded on Optical Write-Once-Read-Many (WORM) Systems*
This technical report applies to the removal of information recorded on WORM disk media when expungement orders are ordered by the court or administrative authority; expungement requires the elimination of information. This report establishes uniform practices for both information removal and to document the action for removal. Following these recommendations will ensure that the expungement is performed consistently. This technical report does not address CD-ROM or rewritable optical media; or information that is retained, managed, or distributed to satisfy the Freedom of Information Act or Privacy Act objectives.

ANSI/AIIM TR31:1-1992 (reaffirmed 1998), *Performance Guideline for the Legal Acceptance of Records Produced by Information Technology Systems Part 1: Evidence*
Laws of reproduction related to government produced or maintained records often reflect the concerns of government archivists. The laws might specify a particular technology that meets longevity and retrieval or copying requirements. Some government requirements severely restrict the use of technology other than microfilm, while a few states, such as California, have enacted legislation to enable government agencies to use optical disk technology. As with federal records, there is generally no absolute bar to admissibility of records produced by analog or digital information technology systems in any state providing a proper foundation is laid. However, there are both federal and state laws, regulations, or rules that specifically require the maintenance and production of original documents for certain purposes.

ANSI/AIIM TR31:2-1993 (reaffirmed 1998), *Performance Guideline for the Legal Acceptance of Records Produced by Information Technology Systems Part 2: Acceptance by Government Agencies*
Legislators and regulators have a legitimate interest to ensure that organizations maintain required information to enable government to perform its legally authorized purpose. By requiring the public to submit information and maintain records, government can determine the impact of the laws and verify compliance. But the degree of burden placed on the public through recordkeeping laws should be balanced against the relative costs and benefits to society of the entire legislative and regulatory scheme. When laws establish unique requirements for records and information management systems, a significant and sometime onerous burden may be placed on the public. Organizations that conduct business in numerous laws, face an even greater burden in the identification, comprehension, and implementation of the multitude of complex and even contradictory requirements.

Records and information system managers need to develop systems that comply with the law and best meet the needs of the organization. New advances continue to be made in information technology that can assist organizations to become more efficient, effective, and profitable. These advances may be thwarted, or even precluded, due to inconsistencies in laws and the slow pace lawmakers follow to recognize new technologies. This part of the performance guideline establishes criteria for legislators to incorporate into statutes that affect recordkeeping and guidelines to appropriately restrict the scope and content of regulations. Regulators can use this guideline in drafting regulations to specify performance requirements for records and information systems developed by the public. Systems designers can also use this guideline to develop systems and procedures that increase the likelihood of legal compliance even before a national consensus is reached related to legal acceptance of records produced by information technology systems.

ANSI/AIIM TR31:3-1994 (reaffirmed 1998), *Performance Guideline for the Legal Acceptance of Records Produced by Information Technology Systems Part 3: Implementation*
For purposes of the performance guideline, an information technology system is any process or system that employs mechanical, photo-optical, magnetic, electronic, or other technological devices for producing or reproducing records. Widespread use of these systems for recordkeeping "in the ordinary course of business" has resulted in rules and regulations that specify particular requirements for acceptance by government agencies, or admission into evidence by courts, of records produced by technological devices. This report provides a systematic approach for implementing recommended recordkeeping practices that meet legal acceptance criteria set forth in Parts 1, 2, and 4 of the Performance Guidelines. Adherence to the guideline facilitates legal acceptance of records produced by information technology systems. Acceptance of the model act and rule promotes uniform treatment of records across jurisdictions and reduces barriers to the beneficial use of information technology. This report also includes a strategy for professional associations, industry groups, and others to promote the adoption of the model act and rule presented in Part 4 of the guideline that establishes requirements consistent with the recommended practices. The self assessment process will help an organization determine if it has established and is following record keeping practices that will minimize problems with legal acceptance requirements. Promotion of the model act and rule is intended to bring about uniformity in laws and policies affecting the use of information technology systems for record keeping and to minimize restrictions that unnecessarily discourage or hamper the use of such systems.

ANSI/AIIM TR31:4-1994 (reaffirmed 1998), *Performance Guideline for the Legal Acceptance of Records Produced by Information Technology Systems Part 4: Model Act and Rule*
The model act and rule are designed to encourage good record keeping practices by providing direction to legislators and government agencies in the establishment of requirements for acceptance of records produced by information technology systems. The model act, as proposed, will have precedent over other contradictory laws and restrict the content of regulations in the record keeping area. The task force also developed a model rule, since it takes a considerable amount of time to have a uniform law enacted, whereas a rule can be implemented by government agencies in a relatively short period of time. An underlying purpose of the model act and rule is to encourage use of information technology systems in the production of records. To this end, a delineation of benefits of such systems (as opposed to paper-based systems) is included. The model rule can be adopted independent of the model act, so long as it is properly promulgated, i.e., it is not arbitrary or capricious or does not violate the dictates of a law. However, adoption of both is encouraged.

ANSI/AIIM TR32-1994, *Paper Forms Design Optimization for Electronic Image Management (EIM)*
The purpose of this technical report is to provide information on characteristics of printed forms that will make them readily accepted in various EIM applications. This document covers forms characteristics that affect scanning. It also addresses forms layout, recognition technology, scanner performance, and data processing and the effect on data capture and data storage. This technical report is not intended to address forms removal technologies or the design of electronic forms.

ANSI/AIIM TR33-1998, *Selecting an Appropriate Image Compression Method to Match User Requirements*
The purpose of this technical report is to provide practical methods for analyzing user requirements for image compression in order to select an appropriate and optimal image compression scheme which matches user requirements. For example, an EIM system configured for scanning, storing, and delivering halftone, line art, text, and continuous tone images will have different image compression requirements as compared to an application involving only text. This technical report is designed to provide guidance in selecting applicable compression algorithms for each among a wide range of source documents.

ANSI/AIIM TR34-1996, *Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems*
This technical report contains procedures that may be used to select and apply sampling inspecting plans to determine if a lot or batch of electronic or micrographic images meets specified quality requirements. Its purpose is to do the following:

- provide guidance to the user when selecting a sampling procedure that will meet risk requirements, and
- enable the user to develop a sampling plan for individual images in a scientific manner.

ANSI/AIIM TR35-1995, *Human and Organizational Issues for Successful EIM System Implementation*
This document provides a fundamental framework for understanding the basic issues and concepts of organizational factors, human factors, and ergonomics for Electronic Image Management (EIM) systems. The principles of human factors and ergonomics are applied to usability criteria for the development and selection of EIM equipment, environmental and implementation issues, and training for long-term productivity benefits. This technical report should help you understand and plan for the non-technical issues that need to be managed when implementing EIM. Recommendations are provided to help prepare organizations for change.

ANSI/AIIM TR40-1995, *Suggested Index Fields for Documents in Electronic Image (EIM) Environments*
The purpose of this technical report is to describe fields of attribute information that are often used with electronic imaging systems. This information may take the form of a collection of database fields or a structured computer record that refers to an image record on an electronic, digital image medium. Such a collection of database fields includes a necessary and sufficient description of the image record to control subsequent storage, retrieval, and archive management related actions with that image record. The information contained in the fields described in this document is similar to that typically used in a text management system. It is designed to be informative to a user if it is displayed in an image query response. System designers could elect to use some or all of the fields described in this technical report in addition to fields that are specific to the application they are designing.

A.2 Document services industry standards

When reviewing document services technologies you should determine whether or not these products meet the recommended industry standards. A vendor/supplier will be able to tell you if they are certified for the following industry standards:

DMWare
DMWare is the open-source distribution and development clearinghouse operated with the institutional sponsorship of AIIM International. The subject matter of DMWare, based on the work of the Document Management Alliance (DMA) and of the Open Document Management API (ODMA) coalition, is public, openly contributed document management software, documentation, and metadata definitions.

AIIM/Document Management Alliance (DMA) Specification
The DMA specification defines software component interfaces that enable uniform search and access to documents stored in multi-vendor document management systems. The DMA organization includes more than 60 user and vendor companies working together as a task force of AIIM to define interoperability specifications that meet the requirements of enterprise document management systems.

Open Document Management API (ODMA)
ODMA specifies a set of interfaces that applications can use to initiate actions within a document management system. The API is intended to be relatively easy for application vendors to incorporate into updates of existing applications. It should not require major restructuring of an application to integrate it with ODMA. Note that this version of ODMA does not specify how document management systems may initiate actions within the applications.

A.3 Workflow industry standards

WfMC — Application Programming Interface (Interface 2 & 3)
The purpose of this document is to specify standard workflow management Application Programming Interfaces (API) which can be supported by workflow management (WFM) products. These API calls provide for a consistent method of access to WFM function in cross-product WFM engines. The API set is named Workflow Application Programming Interfaces (WAPI).

WfMC — Audit Data Specification
The purpose of this document is to specify what information needs to be captured and recorded from the various events occurring during a workflow enactment. This document does not define how the data is stored, but what information is to be gathered and made available for analysis. The information will be called Common Workflow Audit Data (CWAD).

WfMC — Interoperability, Internet, e-mail MIME Binding
This document maps to the WfMC standard, Interoperability Abstract Specification, which provides an abstract specification that defines the functionality necessary to achieve a defined level of interoperability between two or more workflow engines. This document defines a binding that gives concrete type definitions and message formats for the realizations of the abstract specification, using Internet e-mail with MIME encoding as the transport mechanism.

A.4 Document imaging industry standards

ANSI/AIIM MS44-1993, *Recommended Practice for Quality Control of Image Scanners*
This recommended practice provides procedures for the ongoing control of quality within a digital document image management system. The objective is to provide a means of quality control from input to output. Regular use of the recommended procedures should ensure continued maintenance of an established level of quality.

ANSI/AIIM MS52-1991, *Recommended Practice for the Requirements and Characteristics of Original Documents Intended for Optical Scanning*
This standard describes the physical characteristics of paper documents which facilitate black-and-white optical scanning and the characteristics which make scanning either difficult or impossible. It provides general recommendations for the design of documents in order to make these documents easier to scan. This standard does not cover specific scanning applications, such as scanning of checks, scanning of engineering drawings, or scanning of bar codes, which are the subject of other standards. It does not address the technical details for OCR, which is the subject of other standards. Moreover, oversized documents and tiling techniques are not specifically addressed in this standard, although many of the same principles apply.

ANSI/AIIM MS53-1993, *Recommended Practice; File Format for Storage and Exchange of Image; Bi-Level Image File Format: Part 1*
The purpose of this standard is to standardize a self-contained file format for the transfer of bi-level image files in environments other than facsimile telecommunications. The image file format is similar to a Document Application Profile (DAP) and supports the transfer of encoded bi-level raster scan images in environments. This standard covers bi-level images that are coded using CCITT T.4 (Group 3) and T.6 (Group 4), as well as bit-mapped images (having no compression). The file format is media independent.

ANSI/AIIM MS55-1994, *Recommended Practice for the Identification and Indexing of Page Components (Zones) for Automated Processing in an EIM Environment*
This document identifies a media and application independent structure and indexing scheme that will allow necessary and sufficient description of document pages and zones (rectangular sub areas) within a page. These zones can then be processed automatically in the most appropriate fashion, regardless of the nature of data outside the identified zone(s). In particular, this standard recommended practice defines a document page so that the following processes can be applied to its electronic image record:

- data compression specifically suitable to the nature of the data within the zone (e.g., JPEG compression vs. T.6 compression used in Group 4 Fax);
- optical mark recognition;
- optical character recognition;
- intelligent character recognition;
- handprint character recognition;
- raster-to-vector conversion for computer aided design (CAD) or geographic information system (GIS) applications;
- signature capture and recognition (CSR); and
- any other form of compression, image manipulation, or pattern recognition technology, or algorithm(s) that may rely on specific data capture or storage methods.

A.5 Storage and archival standards

ANSI X3.212-1992 (R1997), *130-mm Rewritable Optical Disk Cartridge for Information Interchange*

ANSI X3.220-1992 (R1997), *Digital Information Interchange 130-mm Optical Disk Cartridges of the Write-Once, Read Multiple (WORM) Type, Using the Magnetic-Optical Effect (reaffirmation)*

ANSI/ X.3.234-1993 (R1998), *Test Methods for Media Characteristics — 130 mm Re-writable Optical Disk Data Storage Cartridges with Continuous Composite Servo (CCS)*

ANSI/ISO/IEC 13549-1993, *Data Interchange on 130 mm Optical Disk Cartridges — Capacity: 1,3 Gigabytes Per Cartridge*

ISO/IEC 11560:1992, *Information interchange on 130 mm optical disk cartridges using the magneto-optical effect, for write once, read multiple functionality*

ISO/IEC 14517:1996, *130 mm optical disk cartridges for information interchange — Capacity: 2,6 Gbytes per cartridge*

ISO/IEC 15286:1999, *130 mm optical disk cartridges for information interchange — Capacity: 5,2 Gbytes per cartridge*

Appendix B
Implementation guidelines—High-level activity checklist

Activity	Start Date	End Date
1. Process/Procedure Base-lining		
2. Technology Requirement Definition		
3. Re-Synchronization of baseline (if needed)		
4. Anticipated Processes/Procedures		
5. Requirement Definition		
6. Forms Evaluation		
7. Forms Re-Design (if needed)		
8. Input Processing Requirements		
9. Storage Technology Requirements		
10. User Access/Functionality Requirements		
11. Existing documentation Conversion Review		
12. Acceptance Testing Criteria		
13. Procurement documents (RFP, etc.)		
14. Vendor/Product Evaluation & Selection		
15. Detail Application Design		
16. System Development/Implementation		
17. Business/Policy/Procedure Documentation		
18. Unit and System Testing		
19. User Training		
20. Acceptance Testing		
21. System Rollout		

This form is provided as a guide. Use of this form is for informational purposes only. There may be other activities and/or procedures which should be considered for each project. Form Version 1.0 (2002)

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1100 Wayne Avenue, Suite 1100
Silver Spring, MD 20910-5603
Tel: 301/587-8202
FAX: 301/587-8202
e-mail: aiim@aiim.org
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